PATENT COOPERATION TREATY

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PATENT RECORDS CENTER

From the INTERNATIONAL SEARCHING AUTHORITY

# PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
E.I. DU PONT DE NEMOURS AND COMPANY
Legal/Patent Records Center
Attn. FEULNER, Gregory J
1007 Market Street
Wilmington, Delaware 19898
UNITED STATES OF AMERICA

| | |
|---|---|
| | Date of mailing *(day/month/year)* 12/05/2000 |
| Applicant's or agent's file reference BB1129 PCT | **FOR FURTHER ACTION** See paragraphs 1 and 4 below |
| International application No. PCT/US 99/ 25950 | International filing date *(day/month/year)* 04/11/1999 |
| Applicant E. I. DU PONT DE NEMOURS AND COMPANY et al. | |

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

**For more detailed instructions,** see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

| | |
|---|---|
| Name and mailing address of the International Searching Authority<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL-2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Authorized officer<br>Sandra De Jong-van Dam CLS NOTED 6-2-2000 |

Form PCT/ISA/220 (July 1998)

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

## INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

**What parts of the international application may be amended?**

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

**When?** Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

**Where not to file the amendments?**

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

**How?** Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

**The amendments must be made in the language in which the international application is to be published.**

**What documents must/may accompany the amendments?**

**Letter (Section 205(b)):**

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

**The letter must be in English or French, at the choice of the applicant. However, if the languag of the international application is English, the letter must be in English; if th language of the international application is French, the letter must be in French.**

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

**The following examples illustrate the manner in which amendments must be explained in the accompanying letter:**

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

**"Statement under article 19(1)" (Rule 46.4)**

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international appplication is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

**Consequence if a demand for international preliminary examination has already been filed**

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

**Consequence with regard to translation of the international application for entry into the national phase**

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

ATENT COOPERATION TREAT

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| Applicant's or agent's file reference | **FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
|---|---|---|
| BB1129 PCT | | |
| International application No. | International filing date *(day/month/year)* | (Earliest) Priority Date *(day/month/year)* |
| PCT/US 99/ 25950 | 04/11/1999 | 05/11/1998 |
| Applicant | | |
| E. I. DU PONT DE NEMOURS AND COMPANY et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

[ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

[X] contained in the international application in written form.

[X] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readble form.

[ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [X] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

[X] as suggested by the applicant.

[ ] None of the figures.

[ ] because the applicant failed to suggest a figure.

[ ] because this figure better characterizes the invention.

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/25950

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: (1-23 partially)

   An isolated polynucleotide encoding glutamine amidotransferase from impatiens as set forth in SEQ ID NO: 1, a chimeric gene, a host cell, a virus, a polypeptide as set forth in SEQ ID NO: 2, a method of selecting an isolated polynucleotide, a method of obtaining a nucleic acid, a method for evaluating an inhibitory compound, a compositions, an expression cassette, a method for positive selection comprising said polynucleotide.

2. Claims: (1-23 partially)
   same as invention 1 but comprising a corn glutamine amidotransferase as set forth in SEQ ID NO: 3-8

3. Claims: (1-23 partially)

   same as invention 1 but comprising a rice glutamine amidotransferase as set forth in SEQ ID NO: 9 and 10.

4- Claims: (1-23 partially)

   same as invention 1 but comprising a soybean glutamine aminotransferase as set forth in SEQ ID NO: 11-14.

# INTERNATIONAL SEARCH REPORT

ational Application No
PCT/US 99/25950

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/82 C12N15/52 C12N9/00 C12N5/10 G01N33/50
C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | FUJIMORI K AND OHTA D: "An Arabidopsis cDNA encoding a bifunctional glutamine amidotransferase/cyclase suppresses the histidine auxotrophy of a Saccharomyces cerevisiae his7 mutant" FEBS LETTERS, vol. 428, no. 3, 29 May 1998 (1998-05-29), pages 229-234, XP002136027 the whole document --- | 1-8, 10-15, 17-23 |
| X | KLEM T J AND DAVISSON V J: "Imidazole glycerole phosphate synthase: the glutamine amidotransferase in histidine biosynthesis" BIOCHEMISTRY, vol. 32, 1993, pages 5177-5186, XP002136052 the whole document --- | 16 |
| | -/-- | |

[X] Further documents are listed in the continuation of box C.

[ ] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 19 April 2000 | 12/05/2000 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Oderwald, H |

3

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication,where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| P,X | DATABASE EMEST21 'Online!<br>EMBL Heidelberg, Germany<br>AC/ID AW066760,<br>18 October 1999 (1999-10-18)<br>WALBOT V: "Maize ESTs from various cDNA libraries sequenced at Stanford University"<br>XP002136029<br>abstract<br>--- | 1,3-8,<br>11,<br>13-15,<br>17,19,20 |
| P,X | DATABASE EMEST14 'Online!<br>EMBL Heidelberg, Germany<br>AC/ID AI899863, 28 July 1999 (1999-07-28)<br>SHOEMAKER R ET AL.: "Glycine max cDNA clone similar to: glutamine amidotransferase/cyclase"<br>XP002136030<br>abstract<br>--- | 1,3-8,<br>11,<br>13-15,<br>17,19,20 |
| P,X | DATABASE NEW_TREMBL 'Online!<br>EMBL Heidelberg, Germany<br>AC/ID CAB36536, 17 June 1999 (1999-06-17)<br>BEVAN M ET AL.: "Glutamine amidotransferase/cyclase"<br>XP002136028<br>abstract<br>----- | 10 |

PATENT COOPERATION TREATY

AGBIOTECH FM

by fax and post

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
~~Lynne M. Christenbury~~ Kenny Li
~~E.I. DU PONT DE NEMOURS AND COMPANY~~
Legal/Patent Records Center
1007 Market Street
Wilmington, Delaware 19898
ETATS-UNIS D'AMERIQUE
FAX : (302) 892-7949

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WRITTEN OPINION

(PCT Rule 66)

| | |
|---|---|
| Date of mailing *(day/month/year)* | 04.08.2000 |
| Applicant's or agent's file reference: BB1129 PCT | **REPLY DUE** **within 3 month(s)** from the above date of mailing |

| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
|---|---|---|
| PCT/US99/25950 | 04/11/1999 | 05/11/1998 |

International Patent Classification (IPC) or both national classification and IPC
C12N15/82

Applicant
E. I. DU PONT DE NEMOURS AND COMPANY et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

| | | |
|---|---|---|
| I | ☒ | Basis of the opinion |
| II | ☐ | Priority |
| III | ☒ | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| IV | ☒ | Lack of unity of invention |
| V | ☒ | Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| VI | ☐ | Certain document cited |
| VII | ☐ | Certain defects in the international application |
| VIII | ☒ | Certain observations on the international application |

3. The applicant is hereby **invited to reply** to this opinion.

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4. For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis. For an informal communication with the examiner, see Rule 66.6.

**If no reply is filed**, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 05/03/2001.

TRB NOTED

Name and mailing address of the international preliminary examining authority:
European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner
Giebeler, K

Formalities officer (incl. extension of time limits)
Vullo, C
Telephone No. +49 89 2399 8061

## I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

**Description, pages:**

1-30 as originally filed

**Claims, No.:**

1-23 as originally filed

**Drawings, sheets:**

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

## III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire international application,

☒ claims Nos. 11, 14, 15,

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 11, 14, 15 are so unclear that no meaningful opinion could be formed (*specify*):

**see separate sheet**

☒ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

**IV. Lack of unity of invention**

1. In response to the invitation (Form PCT/IPEA/405) to restrict or pay additional fees, the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with for the following reasons and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees:

**see separate sheet**

3. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this opinion:

☒ all parts.

☐ the parts relating to claims Nos. .

**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | |
|---|---|---|
| Novelty (N) | Claims | 1, 3, 5-8, 10, 16-20 |
| Inventive step (IS) | Claims | 2, 4, 9, 12, 13, 21-23 |
| Industrial applicability (IA) | Claims | |

2. Citations and explanations

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

1. The following documents are cited:

   D1: FUJIMORI K AND OHTA D: FEBS LETTERS, vol. 428, no. 3, 29 May 1998, pages 229-234

   D2: KLEM T J AND DAVISSON V J: BIOCHEMISTRY, vol. 32, 1993, pages 5177-5186

   D3: DATABASE EMEST21 [Online] EMBL Heidelberg, Germany AC/ID AW066760, 18 October 1999 (1999-10-18) WALBOT V: 'Maize ESTs from various cDNA libraries sequenced at Stanford University'

   D4: DATABASE EMEST14 [Online] EMBL Heidelberg, Germany AC/ID AI899863, 28 July 1999 (1999-07-28) SHOEMAKER R ET AL.: 'Glycine max cDNA clone similar to: glutamine amidotransferase/cyclase'

   D5: DATABASE NEW TREMBL [Online] EMBL Heidelberg, Germany AC/ID CAB36536, 17 June 1999 (1999-06-17) BEVAN M ET AL.: 'Glutamine amidotransferase/cyclase'

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

2. No meaningful opinion could be formed on claims 11, 14 and 15 since they are too unclear and not supported by the description.

   Claim 11 refers to a "nucleotide sequence of at least one of 30 contiguous nucleotides derived from an isolated polynucleotide of claim 1", whereby claim 1 is directed to a "polynucleotide comprising a nucleotide sequence encoding a first polypeptide of at least 60 amino acids that has at least 85% identity ... when compared to a polypeptide selected from ... SEQ ID NOs:2, 4, 6, 8, 10, 12, and 14". This means that out of the at least 60 amino acids of the "first polypeptide", at least 51 amino acids (85%) have to occur in one of the listed SEQ ID NOs, whereas nine amino acids (encoded by 27 nucleotides) may differ and can basically be any amino acid. Thus, from the 30 contiguous nucleotides referred to in claim 11, only three nucleotides (one codon encoding one amino acid!) have to occur in the defined SEQ ID NOs., and 27 can be any nucleotide whatsoever.

Claims 14 and 15 refer to a "nucleotide sequence of at least one of 30 contiguous nucleotides from a nucleotide sequence selected from the group consisting of SEQ ID NO:1...". The term "derived from" refers to a process of production and can imply any kind of modification. It does therefore not define the nature of the 30 contiguous nucleotides.

Consequently, the present opinion has only been established for claims 1-10, 12-13 and 16-23.

**Re Item IV**
**Lack of unity of invention**

3. The International Preliminary Examining Authority shares the opinion of the International Searching Authority that the application lacks unity of invention, since the claims are directed to five separate inventions as follows:

**Group I:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **Impatiens**

**Group II:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **corn**

**Group III:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **rice**

**Group IV:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **soybean**

**Group V:** Claim 16 (completely), relating to a method for evaluating at least one compound for its ability to inhibit the activity of any histidine biosynthetic enzyme from **any organism**.

The inventions listed as Groups I to V do not relate to a single inventive concept under Rule 13.1 PCT because they lack the same or corresponding technical features, Rule 13.2 PCT. Groups I to IV have in common that they relate to an isolated polynucleotide encoding glutamine amidotransferase from a plant. However, this feature is not novel, since the document D1 already discloses the cDNA encoding glutamine amidotransferase from Arabidopsis.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

4. The current assessment is based on the assumption that all claims enjoy priority rights from the filing date of the priority document. If it later turns out that this is not correct, the documents D3 to D5 cited in the international search report could become relevant.

5. The present application does not satisfy the criterion set forth in Article 33(1)(2) PCT because the subject-matter of claims 1, 3, 5-8, 10 and 16-20 is not new.

   The document D1 discloses the cDNA encoding glutamine amidotransferase from Arabidopsis, which is shown to functionally complements a S. cerevisiae his7 mutant. The amino acid and nucleotide sequences of the cDNA depicted in Fig. 1 contain stretches of high amino acid and nucleotide sequence identity with the sequences disclosed in the present application. For instance, the 70 amino acids from amino acids 314-383 of D1 differ in only 8 positions from the corresponding sequence of SEQ ID NO:2 (amino acids 285-349) and thus have 88.6% amino acid identity. D1 is thus prejudicial to the novelty of claims 1, 3, 5-8, 10 and 15-20.

   Furthermore, claim 16 lacks novelty over D2 which discloses the cloning and overexpression of HisHF from E. coli and its inhibition by divalent metal ions, in particular $MgCl_2$ and $MnCl_2$, see especially page 5183, column 1, paragraph 3.

   Claims 6-8 lack novelty over naturally occurring plant cells which comprise the genes and polypeptides disclosed in the application. The term "chimeric" used in claim 5 is not suitable to clearly define a features which could distinguish the gene in question from the natural gene.

6. The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of claims 2, 4, 9, 12, 13 and 21-23 does not involve an inventive step.

6.1. None of the sequences disclosed in the application has been demonstrated to actually encode a polypeptide having a useful property, e.g. glutamine amidotrasferase activity. Consequently, the invention of the present application is considered merely to be the provision of a transcribed sequence ("a DNA") with no known technical useful property.
In this case, **any** prior art compound (e.g. DNA or protein) is equally suitable as the starting point for making structural modifications and may be considered as the "closest prior art".
Starting from this point, the only technical problem which may be derived is the provision of a further compound as such, regardless of its useful properties.
Without the concomitant need to provide any particular technical effect, the skilled person would have had the choice of an infinite number of equally possible solutions. An arbitrary selection from this host of possible solutions cannot involve an inventive step because, in order to be inventive, the selection must not be arbitrary but must be justified by the technical purpose, i.e. by a hitherto unknown or unexpected technical effect which is caused by those structural features distinguishing the claimed compound from the numerous other ones.

6.2. However, it should be noted that even if the glutamine amidotrasferase activity was shown for the polypeptides encoded by the disclosed polynucleotides, an inventive step could still not be acknowledged for the present claims. Once a protein has been identified and its gene has been cloned from one organism, the cloning of the equivalent genes from other organisms is merely routine and not based on an inventive step. Furthermore, none of the claims appears to contain any additional features which involve an inventive step, because these features are within the scope of the customary practice followed by person skilled in the art, especially as the advantages thus achieved can be readily contemplated in advance.

## Re Item VIII
## Certain observations on the international application

7. Independent claim 16 does not state that the host cell is transformed with a gene according to the application, i.e. the glutamine amidotransferase gene of

Impatiens, corn, rice or soybean. Therefore, the claim does meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

# PATENT COOPERATION TREATY



From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Lynne M. Christenbury
E.I. DU PONT DE NEMOURS AND COMPANY
Legal/Patent Records Center
1007 Market Street
Wilmington, Delaware 19898
ETATS-UNIS D'AMERIQUE

## NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

| | |
|---|---|
| Date of mailing *(day/month/year)* | 28.11.2000 |
| Applicant's or agent's file reference | **IMPORTANT NOTIFICATION** |
| BB1129 PCT | |

| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
|---|---|---|
| PCT/US99/25950 | 04/11/1999 | 05/11/1998 |

Applicant
E. I. DU PONT DE NEMOURS AND COMPANY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

REY noted

| Name and mailing address of the IPEA/ | Authorized officer |
|---|---|
| European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Emslander, S<br><br>Tel.+49 89 2399-8718 |

Form PCT/IPEA/416 (July 1992)

05 MAY 2001

PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference | FOR FURTHER ACTION | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| BB1129 PCT | | |
| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
| PCT/US99/25950 | 04/11/1999 | 05/11/1998 |
| International Patent Classification (IPC) or national classification and IPC<br>C12N15/82 | | |
| Applicant<br>E. I. DU PONT DE NEMOURS AND COMPANY et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

| Date of submission of the demand | Date of completion of this report |
|---|---|
| 29/05/2000 | 28.11.2000 |
| Name and mailing address of the international preliminary examining authority:<br>European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized officer<br>Giebeler, K<br>Telephone No. +49 89 2399 8546 |

Form PCT/IPEA/409 (cover sheet) (January 1994)

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/25950

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:
**Description, pages:**

| | |
|---|---|
| 1-30 | as originally filed |

**Claims, No.:**

| | |
|---|---|
| 1-23 | as originally filed |

**Drawings, sheets:**

| | |
|---|---|
| 1/4-4/4 | as originally filed |

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   ☐ the language of publication of the international application (under Rule 48.3(b)).
   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.
   ☐ filed together with the international application in computer readable form.
   ☐ furnished subsequently to this Authority in written form.
   ☐ furnished subsequently to this Authority in computer readable form.
   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:
   ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 11,14,15.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 11,14,15 are so unclear that no meaningful opinion could be formed (*specify*):
**see separate sheet**

☒ the claims, or said claims Nos. 11,14,15 are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:
**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Yes: | Claims | 2,4,9,12,13,21-23 |
| | No: | Claims | 1,3,5-8,10,16-20 |
| Inventive step (IS) | Yes: | Claims | |
| | No: | Claims | 2,4,9,12,13,21-23 |
| Industrial applicability (IA) | Yes: | Claims | 1-10,12,13,16-23 |
| | No: | Claims | |

2. Citations and explanations
**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
**se separate sheet**

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT - SEPARATE SHEE** In

please cite the corresponding U.S case (if any) and prepare an IDS if necessary

US PCT file only

1. The following documents are cited:

D1: FUJIMORI K AND OHTA D: FEBS L pages 229-234

D2: KLEM T J AND DAVISSON V J: BIO( 5177-5186

D3: DATABASE EMEST21 [Online] EMBL AW066760, 18 October 1999 (1999-10 various cDNA libraries sequenced at St

D4: DATABASE EMEST14 [Online] EMBL AI899863, 28 July 1999 (1999-07-28) S cDNA clone similar to: glutamine amidot

D5: DATABASE NEW TREMBL [Online] EM CAB36536, 17 June 1999 (1999-06-17) I amidotransferase/cyclase'

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

2. No meaningful opinion could be formed on claims 11, 14 and 15 since they are too unclear and not supported by the description.

Claim 11 refers to a "nucleotide sequence of at least one of 30 contiguous nucleotides derived from an isolated polynucleotide of claim 1", whereby claim 1 is directed to a "polynucleotide comprising a nucleotide sequence encoding a first polypeptide of at least 60 amino acids that has at least 85% identity ... when compared to a polypeptide selected from ... SEQ ID NOs:2, 4, 6, 8, 10, 12, and 14". This means that out of the at least 60 amino acids of the "first polypeptide", at least 51 amino acids (85%) have to occur in one of the listed SEQ ID NOs, whereas nine amino acids (encoded by 27 nucleotides) may differ and can basically be any amino acid. Thus, from the 30 contiguous nucleotides referred to in claim 11, only three nucleotides (one codon encoding one amino acid!) have to occur in the defined SEQ ID NOs., and 27 can be any nucleotide whatsoever.

Claims 14 and 15 refer to a "nucleotide sequence of at least one of 30 contiguous nucleotides from a nucleotide sequence selected from the group consisting of SEQ ID NO:1...". The term "derived from" refers to a process of production and can imply any kind of modification. It does therefore not define the nature of the 30 contiguous nucleotides.

Consequently, the present opinion has only been established for claims 1-10, 12-13 and 16-23.

**Re Item IV**

**Lack of unity of invention**

3. The International Preliminary Examining Authority shares the opinion of the International Searching Authority that the application lacks unity of invention, since the claims are directed to five separate inventions as follows:

**Group I:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **Impatiens**

**Group II:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **corn**

**Group III:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **rice**

**Group IV:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **soybean**

**Group V:** Claim 16 (completely), relating to a method for evaluating at least one compound for its ability to inhibit the activity of any histidine biosynthetic enzyme from **any organism**.

The inventions listed as Groups I to V do not relate to a single inventive concept under Rule 13.1 PCT because they lack the same or corresponding technical features, Rule 13.2 PCT. Groups I to IV have in common that they relate to an isolated polynucleotide encoding glutamine amidotransferase from a plant. However, this feature is not novel, since the document D1 already discloses the cDNA encoding glutamine amidotransferase from Arabidopsis.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

4. The current assessment is based on the assumption that all claims enjoy priority rights from the filing date of the priority document. If it later turns out that this is not correct, the documents D3 to D5 cited in the international search report could become relevant.

5. The present application does not satisfy the criterion set forth in Article 33(1)(2) PCT because the subject-matter of claims 1, 3, 5-8, 10 and 16-20 is not new.

   The document D1 discloses the cDNA encoding glutamine amidotransferase from Arabidopsis, which is shown to functionally complements a S. cerevisiae his7 mutant. The amino acid and nucleotide sequences of the cDNA depicted in Fig. 1 contain stretches of high amino acid and nucleotide sequence identity with the sequences disclosed in the present application. For instance, the 70 amino acids from amino acids 314-383 of D1 differ in only 8 positions from the corresponding sequence of SEQ ID NO:2 (amino acids 285-349) and thus have 88.6% amino acid identity. D1 is thus prejudicial to the novelty of claims 1, 3, 5-8, 10 and 15-20.

   Furthermore, claim 16 lacks novelty over D2 which discloses the cloning and overexpression of HisHF from E. coli and its inhibition by divalent metal ions, in particular $MgCl_2$ and $MnCl_2$, see especially page 5183, column 1, paragraph 3.

   Claims 6-8 lack novelty over naturally occurring plant cells which comprise the genes and polypeptides disclosed in the application. The term "chimeric" used in claim 5 is not suitable to clearly define a features which could distinguish the gene in question from the natural gene.

6. The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of claims 2, 4, 9, 12, 13 and 21-23 does not involve an inventive step.

6.1. None of the sequences disclosed in the application has been demonstrated to actually encode a polypeptide having a useful property, e.g. glutamine amidotrasferase activity. Consequently, the invention of the present application is considered merely to be the provision of a transcribed sequence ("a DNA") with no known technical useful property.
In this case, **any** prior art compound (e.g. DNA or protein) is equally suitable as the starting point for making structural modifications and may be considered as the "closest prior art".
Starting from this point, the only technical problem which may be derived is the provision of a further compound as such, regardless of its useful properties.
Without the concomitant need to provide any particular technical effect, the skilled person would have had the choice of an infinite number of equally possible solutions. An arbitrary selection from this host of possible solutions cannot involve an inventive step because, in order to be inventive, the selection must not be arbitrary but must be justified by the technical purpose, i.e. by a hitherto unknown or unexpected technical effect which is caused by those structural features distinguishing the claimed compound from the numerous other ones.

6.2. However, it should be noted that even if the glutamine amidotrasferase activity was shown for the polypeptides encoded by the disclosed polynucleotides, an inventive step could still not be acknowledged for the present claims. Once a protein has been identified and its gene has been cloned from one organism, the cloning of the equivalent genes from other organisms is merely routine and not based on an inventive step. Furthermore, none of the claims appears to contain any additional features which involve an inventive step, because these features are within the scope of the customary practice followed by person skilled in the art, especially as the advantages thus achieved can be readily contemplated in advance.

## Re Item VIII

## Certain observations on the international application

7. Independent claim 16 does not state that the host cell is transformed with a gene according to the application, i.e. the glutamine amidotransferase gene of

Impatiens, corn, rice or soybean. Therefore, the claim does meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

PATENT COOPERATION TREATY

REC'D 30 NOV 2000
WIPO PCT

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# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference | FOR FURTHER ACTION | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| BB1129 PCT | | |
| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
| PCT/US99/25950 | 04/11/1999 | 05/11/1998 |
| International Patent Classification (IPC) or national classification and IPC<br>C12N15/82 | | |
| Applicant<br>E. I. DU PONT DE NEMOURS AND COMPANY et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

| Date of submission of the demand | Date of completion of this report |
|---|---|
| 29/05/2000 | 28.11.2000 |
| Name and mailing address of the international preliminary examining authority:<br>European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized officer<br>Giebeler, K<br>Telephone No. +49 89 2399 8546 |

Form PCT/IPEA/409 (cover sheet) (January 1994)

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/25950

## I. Basis f the r p rt

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:
**Description, pages:**

1-30 as originally filed

**Claims, No.:**

1-23 as originally filed

**Drawings, sheets:**

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 11,14,15.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 11,14,15 are so unclear that no meaningful opinion could be formed (*specify*):
**see separate sheet**

☒ the claims, or said claims Nos. 11,14,15 are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:
**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Yes: | Claims | 2,4,9,12,13,21-23 |
| | No: | Claims | 1,3,5-8,10,16-20 |
| Inventive step (IS) | Yes: | Claims | |
| | No: | Claims | 2,4,9,12,13,21-23 |
| Industrial applicability (IA) | Yes: | Claims | 1-10,12,13,16-23 |
| | No: | Claims | |

2. Citations and explanations
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
**see separate sheet**

1. The following documents are cited:

   D1: FUJIMORI K AND OHTA D: FEBS LETTERS, vol. 428, no. 3, 29 May 1998, pages 229-234

   D2: KLEM T J AND DAVISSON V J: BIOCHEMISTRY, vol. 32, 1993, pages 5177-5186

   D3: DATABASE EMEST21 [Online] EMBL Heidelberg, Germany AC/ID AW066760, 18 October 1999 (1999-10-18) WALBOT V: 'Maize ESTs from various cDNA libraries sequenced at Stanford University'

   D4: DATABASE EMEST14 [Online] EMBL Heidelberg, Germany AC/ID AI899863, 28 July 1999 (1999-07-28) SHOEMAKER R ET AL.: 'Glycine max cDNA clone similar to: glutamine amidotransferase/cyclase'

   D5: DATABASE NEW TREMBL [Online] EMBL Heidelberg, Germany AC/ID CAB36536, 17 June 1999 (1999-06-17) BEVAN M ET AL.: 'Glutamine amidotransferase/cyclase'

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

2. No meaningful opinion could be formed on claims 11, 14 and 15 since they are too unclear and not supported by the description.

   Claim 11 refers to a "nucleotide sequence of at least one of 30 contiguous nucleotides derived from an isolated polynucleotide of claim 1", whereby claim 1 is directed to a "polynucleotide comprising a nucleotide sequence encoding a first polypeptide of at least 60 amino acids that has at least 85% identity ... when compared to a polypeptide selected from ... SEQ ID NOs:2, 4, 6, 8, 10, 12, and 14". This means that out of the at least 60 amino acids of the "first polypeptide", at least 51 amino acids (85%) have to occur in one of the listed SEQ ID NOs, whereas nine amino acids (encoded by 27 nucleotides) may differ and can basically be any amino acid. Thus, from the 30 contiguous nucleotides referred to in claim 11, only three nucleotides (one codon encoding one amino acid!) have to occur in the defined SEQ ID NOs., and 27 can be any nucleotide whatsoever.

Claims 14 and 15 refer to a "nucleotide sequence of at least one of 30 contiguous nucleotides from a nucleotide sequence selected from the group consisting of SEQ ID NO:1...". The term "derived from" refers to a process of production and can imply any kind of modification. It does therefore not define the nature of the 30 contiguous nucleotides.

Consequently, the present opinion has only been established for claims 1-10, 12-13 and 16-23.

**Re Item IV**

**Lack of unity of invention**

3. The International Preliminary Examining Authority shares the opinion of the International Searching Authority that the application lacks unity of invention, since the claims are directed to five separate inventions as follows:

**Group I:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **Impatiens**

**Group II:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **corn**

**Group III:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **rice**

**Group IV:** Claims 1-15, 17-23 (partially), relating to an isolated polynucleotide encoding glutamine amidotransferase from **soybean**

**Group V:** Claim 16 (completely), relating to a method for evaluating at least one compound for its ability to inhibit the activity of any histidine biosynthetic enzyme from **any organism**.

The inventions listed as Groups I to V do not relate to a single inventive concept under Rule 13.1 PCT because they lack the same or corresponding technical features, Rule 13.2 PCT. Groups I to IV have in common that they relate to an isolated polynucleotide encoding glutamine amidotransferase from a plant. However, this feature is not novel, since the document D1 already discloses the cDNA encoding glutamine amidotransferase from Arabidopsis.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

4. The current assessment is based on the assumption that all claims enjoy priority rights from the filing date of the priority document. If it later turns out that this is not correct, the documents D3 to D5 cited in the international search report could become relevant.

5. The present application does not satisfy the criterion set forth in Article 33(1)(2) PCT because the subject-matter of claims 1, 3, 5-8, 10 and 16-20 is not new.

   The document D1 discloses the cDNA encoding glutamine amidotransferase from Arabidopsis, which is shown to functionally complements a S. cerevisiae his7 mutant. The amino acid and nucleotide sequences of the cDNA depicted in Fig. 1 contain stretches of high amino acid and nucleotide sequence identity with the sequences disclosed in the present application. For instance, the 70 amino acids from amino acids 314-383 of D1 differ in only 8 positions from the corresponding sequence of SEQ ID NO:2 (amino acids 285-349) and thus have 88.6% amino acid identity. D1 is thus prejudicial to the novelty of claims 1, 3, 5-8, 10 and 15-20.

   Furthermore, claim 16 lacks novelty over D2 which discloses the cloning and overexpression of HisHF from E. coli and its inhibition by divalent metal ions, in particular $MgCl_2$ and $MnCl_2$, see especially page 5183, column 1, paragraph 3.

   Claims 6-8 lack novelty over naturally occurring plant cells which comprise the genes and polypeptides disclosed in the application. The term "chimeric" used in claim 5 is not suitable to clearly define a features which could distinguish the gene in question from the natural gene.

6. The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of claims 2, 4, 9, 12, 13 and 21-23 does not involve an inventive step.

6.1. None of the sequences disclosed in the application has been demonstrated to actually encode a polypeptide having a useful property, e.g. glutamine amidotrasferase activity. Consequently, the invention of the present application is considered merely to be the provision of a transcribed sequence ("a DNA") with no known technical useful property.
In this case, **any** prior art compound (e.g. DNA or protein) is equally suitable as the starting point for making structural modifications and may be considered as the "closest prior art".
Starting from this point, the only technical problem which may be derived is the provision of a further compound as such, regardless of its useful properties.
Without the concomitant need to provide any particular technical effect, the skilled person would have had the choice of an infinite number of equally possible solutions. An arbitrary selection from this host of possible solutions cannot involve an inventive step because, in order to be inventive, the selection must not be arbitrary but must be justified by the technical purpose, i.e. by a hitherto unknown or unexpected technical effect which is caused by those structural features distinguishing the claimed compound from the numerous other ones.

6.2. However, it should be noted that even if the glutamine amidotrasferase activity was shown for the polypeptides encoded by the disclosed polynucleotides, an inventive step could still not be acknowledged for the present claims. Once a protein has been identified and its gene has been cloned from one organism, the cloning of the equivalent genes from other organisms is merely routine and not based on an inventive step. Furthermore, none of the claims appears to contain any additional features which involve an inventive step, because these features are within the scope of the customary practice followed by person skilled in the art, especially as the advantages thus achieved can be readily contemplated in advance.

## Re Item VIII

**Certain observations on the international application**

7. Independent claim 16 does not state that the host cell is transformed with a gene according to the application, i.e. the glutamine amidotransferase gene of

Impatiens, corn, rice or soybean. Therefore, the claim does meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.